**Florida Institute of Technology**

**ADDING A NEW COURSE TO THE CURRICULUM**

This course is available for student registration only after the approval process has been completed.

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>VS</th>
<th>COURSE NO.*</th>
<th>CREDIT HOURS</th>
<th>TERM TO BE ADDED TO THE FILE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(e.g., CS)</em></td>
<td><em>(e.g., 1301)</em></td>
<td>2402</td>
<td>3</td>
<td>Spring 2013 <em>(e.g, Fall 2010)</em></td>
</tr>
</tbody>
</table>

Justify level if 1000-level and no co- or prerequisites.

CLASS HOURS: 45/semester  
LECTURE HOURS:  
LAB HOURS:  
CONTACT HOURS (CEU ONLY):  

DEPARTMENT: Aeronautics/Academic  
SCHEDULE TYPE: Lecture (A)  
(e.g., Lecture, Lab or Special Topics/Project)

☐ COLLEGE OF AERONAUTICS – 23  
☐ NATHAN M. BISK COLLEGE OF BUSINESS – 24  
☐ COLLEGE OF ENGINEERING – 1  
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS – 25  
☐ COLLEGE OF SCIENCE – 26  
☐ EXTENDED STUDIES DIVISION / NATHAN M. BISK COLLEGE OF BUSINESS – 90

COMPUTER TITLE: **Intro to Aviation Environ Sci**  
Dual-Prefix, Bl-Level, Full-Load? ☐ Yes ☒ No

CATALOG TITLE: Introduction to Aviation Environmental Science

CATALOG DESCRIPTION OF COURSE: Restricted to 350 characters, including spaces

Introduces basic principles of environmental science directly applicable to the aviation industry. Includes air and water quality, contaminants of concern, properties of contaminants and air quality measurements at airports.

This description has been approved by the catalog office **10/15/12**

*In addition, please attach a course syllabus and/or more detailed description.*

<table>
<thead>
<tr>
<th>RESTRICTIONS</th>
<th>PREREQUISITE</th>
<th>COREQUISITE</th>
<th>Course Number</th>
<th>and</th>
<th>or</th>
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ADDITIONAL RESTRICTION: (e.g., Major, Class Level, Department Head Approval)

*If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.*

<table>
<thead>
<tr>
<th>SUBJECT Alpha Prefix (e.g., CS)</th>
<th>COURSE NO. (e.g., 1301)</th>
<th>TERM TO INACTIVATE</th>
</tr>
</thead>
</table>

**APPROVALS:** Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

**Registrar’s Use Only**

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Operator Init.  
Date

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RRG-150-112
Proposed Aviation Environmental Science Course

AVS 2402  Introduction to Aviation Environmental Science

FLORIDA INSTITUTE OF TECHNOLOGY
COLLEGE OF AERONAUTICS

AVS 4xxx
Introduction to Aviation Environmental Science

Instructor:  Ismael Cremer: icremer@fit.edu, Extension: 7629

Course Description:
Introduces the basic principles of Environmental Science directly applicable to the Aviation industry including: air and water quality, contaminants of concern, properties of contaminants, fate and transport of contaminants, hazardous waste risk assessment, and Air quality measurement. Environmental Impact Statements will also be addressed

Recommended Text:
Environmental Pollution and Control (4th Edition) (Peirce et al.)

Objectives:
Students who successfully complete this course will be able:

1) Explain the key concepts of Environmental Analysis at airports
2) Identify contaminants of concern
3) Explain the fate and transport of contaminants in the aviation industry
4) Analyze and interpret environmental data utilizing modeling techniques
5) Describe the basic methods of reducing pollution in the aviation industry

Grading:

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<tr>
<th>Grade</th>
<th>Percentage</th>
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<tr>
<td>A</td>
<td>90+</td>
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<tr>
<td>B</td>
<td>80-89</td>
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<tr>
<td>C</td>
<td>70-79</td>
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<tr>
<td>D</td>
<td>60-69</td>
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<tr>
<td>F</td>
<td>50-59</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete</td>
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HWK 10%
Exam 1 10%
Exam 2 20%
Exam 3 20%
Term Project 15%
Final Exam 25%

Homework: will consist of Learning Assessments posted on the course website.
Examinations will be closed book and may include essay questions, conceptual questions requiring diagrams and explanations, analysis questions requiring analysis, matching questions, multiple choice questions, and fill in the blank questions. The final exam is comprehensive.

Term Project:

Is a scientific research paper of one of the following topics:

1. Atmospheric pollution at a Class D airport consisting of flight training
2. Methods of reducing contaminants of concern at an Airport
3. Analyzing the fate of contaminants and their transport into aquifer systems

Students will have to include in their report:

1. Planning stage
2. Data collection method
3. Analysis of data

If they are unable to collect data, a thorough literature review will need be conducted.

Instructor Policies:

Quizzes will be announced prior to class.

Please Note 75% attendance throughout the semester is required, otherwise an ‘F’ will be issued.

No texting in class.

Homework is to be handed on the date it is due. Late homework will not be accepted. Students may work together to understand homework assignments, but ultimately homework is to be completed individually. Identical homework will assume to have been copied, and will each receive 0’s.

Assistance is readily available. I am easily reached via email. Appointments may be made through the COA administrative assistants. Walk-ins are welcome during my office hours.

Departmental Classroom Policies:

Cheating or breaches of professional integrity will not be tolerated.

No Smoking, eating, or drinking by any person in any classroom.
Feet will not be placed on tabletops or adjacent chairs.

Distractive, disruptive, or destructive students will be admonished and may be ejected from the classroom.

If the instructor is more than ten minutes late to class, a class representative will go to the COA office to notify/inquire. Class must remain for 1/3 of period in absence of instructor.
CLASS SCHEDULE

**Week 1**

Introduction to Aviation Environmental Science
contaminants of concern
- Classification
- Major sources
- Toxicology
- Priority pollutants
- Emerging pollutants

**Week 2**

Properties of Contaminants 1
- Solubility
- Density
- Vapor Pressure

**Week 3**

Properties of contaminants 2
- Henry’s Constant (Kh)
- Octanol-Water partitioning coefficient (Kow)
- Distribution coefficient (Kd)
- Dissociation constant

**Week 4**

Fate and transport of contaminants
- Structure of environmental media
- Movement of contaminants
  - Advection
  - Diffusion and dispersion
  - Retardation
  - Colloid-facilitated transport
- Reactions of pollutants
  - Chemical processes
  - Biological processes
Week 5

Environmental Risk assessment
  - Human Risk Assessment
    o Hazard identification
    o Toxicity assessment
    o Exposure assessment
    o Risk characterization
  - Ecological Risk assessment (ERA)

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Week 6

Environmental Risk Management (ERM)
  - Risk management
  - Hazard analysis and critical control points
  - The EPA and regulations pertaining to Aviation

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Week 7

Water quality and parameters and their measurement
  - Physical parameters
  - Chemical parameters
  - Microbiological parameters

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Week 8

Analysis of ground water contamination near aviation fields
  - Aquifer contamination
  - Glycol and other de-icing fluid contamination
  - Petroleum based contamination
  - Underground storage tanks (USTs) and issues
Week 9

Analytical techniques in Aviation Environmental Science
- Chemical separation
  - Gas chromatography
  - High-performance liquid chromatography (HPLC)
- Chemical detection
  - Atomic adsorption
  - Mass spectroscopy
  - Infrared

Week 10

Analytical Techniques in Aviation Environmental Science part 2
- Review of literature
- Current events in Airport design and environmental issues

Week 11

Water quality control technologies for nearby groundwater aquifers near airports

Week 12

Major air pollutants and their properties
- CO
- SO2
- NOx
- Hydrocarbons
- Particulates

Week 13

Fate and transport of major air pollutants
- Analysis of hydrocarbon emissions in large airports
- AEDT exercise 1
Week 14

AEDT Exercise 2
   - mitigating hydrocarbon emissions by altering ground operations and flight tracks

Week 15

Air Quality Measurement
   - Air Quality Index (AQI)
   - Air monitoring
   - Air sampling

Week 16

Mobile source control and regulation
   - Engine improvement
   - Alternative fuels
   - Mass transit in airports
   - Stricter emission standards (Environmental Tax and EPA solutions)